



AEC-NASA TECH BRIEF

Space Nuclear Systems Office



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(AUTOTEM) Automated Geometry Meshing and Heat Conduction Calculation

The problem:

To calculate a temperature distribution for an arbitrary irregular body by finite difference solution, the body must first be divided into a finite number of lumped masses or nodal points. The majority of the input data required for the analysis describes the physical nodal system. Preparing these input data was previously done manually. This procedure was time consuming and error prone.

The solution:

AUTOTEM generates the required input data automatically by computer and calculates the temperature distribution for a two-dimensional plane section in (x,y) coordinates or for an axisymmetric irregular body in (r, z) coordinates.

How it's done:

AUTOTEM consists of four major sections: (1) meshing the peripheral nodes by MESHER, (2) generating the regular interior nodes and input data required by the TOSS or TAP-A temperature calculation codes, (3) calculating the temperature distributions, and (4) plotting the general nodal network and isotherms. The data generated from each section are stored on tape and punched on cards. The

execution of the problem can be stopped at the end of any section, if desired.

Notes:

1. The AUTOTEM code can handle any two-dimensional (constant in the third dimension) or axisymmetric body consisting of a single material. Time dependent internal heat generation, temperature dependent material thermal properties, and time dependent boundary conditions can be considered.
2. This program is written in FORTRAN IV and Assembly languages for use on the CDC-6600, 64K computer.
3. The plot programs used are from a standard program package for the SC-4020 CRT data plotter.
4. Inquiries concerning this program may be directed to:

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